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ABSTRACT

The traditional manually-controlled circulation records of the Burroughs Corporation Library in Goleta, California, presented problems of inaccuracies, time time-consuming searches. and lack of use statistics. An automated system with the capacity to do file maintenance and statistical record-keeping was implemented on a Burroughts B1700 computer. Results proved to be efficient and economical. (EMH)

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AN AUTOMATED CIRCULATION SYSTEM FOR A SMALL TECHNICAL LIBRARY

by

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AN AUTOMATED CIRCULATION SYSTEM FOR A SMALL TECHNICAL LIBRARY

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ABSTRACT

Paper describes a practical solution for automating circulation for a collection of 1000 volumes. System utilizes parent institution's Burroughs B1700 computer and does not require additional data collection terminals. Benefits include automatic preparation of user notices and lists of circulating items, automatic statistic collection and increased information on collection usage.

INTRODUCTION

While automated circulation systems have been in existence in large and medium-sized libraries for some time (1,3), such systems are feasible on a lesser scale for even a very small library. This paper describes an automated circulation system which has been implemented for the Burroughs Corporation Library in Goleta, California. The library, which houses a collection of 1000 volumes in the areas of computer science, electronic engineering and business administration, serves 650 users and is staffed by a single professional librarian. Technical report and book circulation averages 85 items per month. The circulation policy is liberal: all items with the exception of reference books circulate for an unlimited period of time but are subject to recall after three weeks. In addition, a limited number of items are loaned on a permanent basis to a department or an individual.

Prior to automation, a single card for each circulation transaction was manually filed in call number sequence. In addition, statistics on usage by department were gathered by hand. While this system was easily maintained, it presented definite shortcomings in the area of control of the collection. Since it was impractical to prepare user notices owing to the call number sequencing of the file, books would circulate for long periods of time. As a result, users had a tendency to forget that they had certain items, and some items would eventually disappear altogether. To give library clearance to an individual leaving the company, it was necessary to search the entire circulation file. This process was cumbersome and as the circulation file increased in size, the probability of overlooking an item to be recalled also increased.

The decision to automate was based on a desire to overcome the shortcomings of the existing system described above as well as the ready availability of computer time on one of the company's computers. In addition, the librarian was an experienced computer programmer so no outside support would be required. It was felt that the benefits of automatic report generation and the additional statistical information gathered by the new system would more than compensate for the additional clerical effort required to prepare input to the automated system.

SYSTEM DESIGN

The automated system is implemented on a Burroughs B1700 computer which is a small, multi-programming machine with virtual memory. (5) Input is from cards and the files reside on disk. The system consists of two programs. The first selectively performs all file maintenance and report generation functions; the second initializes the statistics file. Both programs are written in the COBOL language. Because the elements of the circulation file comprise a data base, the Burroughs B1700 Data Management System* is utilized for file handling.

To create a data base using this data management system, the user must first identify each data element and establish the relationship between these elements by classifying related items into sets. Once this has been accomplished, each item is defined in a prescribed format and is processed by a compiler which creates the actual data sets and the linkages necessary to maintain their inter-relationships on disk. The user subsequently establishes an interface between his COBOL program and the data base by INVOKING his data base in the DATA DIVISION of his program. The data base is then accessible by a set of predefined programming instructions such as CREATE, DELETE, MODIFY, FIND and STORE. The actual manipulation of the data to perform these operations is indiscernable by the user; he is notified only if the operation was not completed successfully. Because the user need not concern himself with the mechanics of file handling, implementation of a data base system becomes a fairly negligible task once the data relationships have been established.

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*Proprietary product of the Burroughs Corporation, Detroit, Michigan 48232

Data for this system is organized into three data management sets. The book set is ordered on and accessed by call number and also includes the short title, name and department number of the individual to whom the item is charged, the date the item was checked out and a code to reflect any deviations such as a permanent loan. The patron set is ordered on and accessed by the patron's last name and contains a list of all books charged out to that individual by call number and title. The weeding set is maintained in order of and accessed by the call number and includes the number of times each item has circulated as well as the date it last circulated. Each of these sets may be accessed either randomly or sequentially. In addition, a one record statistics file is maintained which includes the number of tiems circulated to each department by month for one calendar year.

At the outset, it was determined that the system would be structured on the absence concept, that is, only items in circulation would be recorded by the system. Coding and keypunching the entire shelf list was not justifiable in terms of time required to accomplish the task. None of the books contained book pockets which presented an additional problem as did the recreation of book cards which were lost or mutilated. Since no data entry equipment was to be utilized for input into the system, a record had to be coded for the user for each transaction and it was felt to be most efficient to combine the identification of the item with the identification of the user on a single card. At the current circulation rate, this required preparing a maximum of fifty cards per week.

Input to the system is prepared by the librarian. For each item checked out, two transaction records are created. The first indicates that the book was checked out; the second is filed with the check-out card and is processed when the book is returned. Additional records are created when a book is to be recalled for another user or for cataloging. Transactions are currently keypunched and processed once a week.

Each transaction is punched on a separate card in the following format:

COL 1-2	TRANSACTION CODE
	01 = Item checked out
	02 = Item returned
	03 = Recall for cataloging
	04 = Recall for another user
	05 = Item checked out after being checked in during the same processing run
COL 3-25	CALL NUMBER
3-19	LC number
20	Copy number
21-23	Volume
24-25	Year
COL 26-29	USER'S DEPARTMENT NUMBER
COL 30-35	DATE CHECKED OUT
COL 36-50	USER'S NAME (LAST, FIRST INITIAL)
COL 51-80	SHORT TITLE

NOTE: Except for transaction codes 01 and 05, the only information required for processing is the transaction code and the complete call number.

Checks are built into the system to handle such data errors as invalid transaction codes. The data management system disallows entering a new record into the system if a record in the book set already exists with the identical call number. The data management system further handles all additions and deletions to the files, thereby making most efficient usage of disk by reassigning areas as they become available.

Output from the system consists of five reports which are generated from options punched free-form on a specification card. A list of books in circulation by call number sequence is generated automatically but may be supressed by means of the NOBOOK option. This report also identifies items to be recalled for cataloging or use by another patron. The PATRON option generates notices to

the users; SINGLE creates a listing of all books checked out in user name sequence. The statistic report is generated by specifying STAT and includes total circulation for each month, a grand total for the year-to-date as well as individual monthly totals by department. USER generates the report on collection usage for weeding or use in book selection. The statistics report is created once a month and notices to the users are also distributed on a monthly basis. Reports in call number sequence and user name sequence are created as a result of the weekly update. Refer to the appendix for samples of each type of report.

Additional output consist of an on-demand inquiry capability by individual name which produces a listing of books held by this individual, if any. This report is generated by entering INQ on the specification card, followed by the list of names, one per card, punched in COL 1-15. The INQ option may not be included with any other options but must be run separately.

IMPLEMENTATION

Conversion from the manual to the automated system was completed within a month. It required coding records for all books in circulation at that time which numbered approximately 300. These records were then keypunched and the initial run was made. As soon as the data base was initialized, the statistics file was also initialized and the system became operational. Approximately 45 minutes of computer time was required for the initial conversion.

The system requires fifteen minutes of computer time per week for updating the files and an additional fifteen minutes is required once a month for preparing reports. Less than two hours per month are devoted to maintaining the manual file and data preparation by the librarian. The estimated rate for internal use of the B1700 is $35/hour; however, computer time is currently available to the library at no charge.

CONCLUSIONS

While the system has not been operational for a long enough period to justify any definitive conclusions, the following tentative results may be advanced. The system provides a very practical means for enacting control over the circulation for this library by providing a large amount of information at a very low cost, both in terms of manpower and equipment. It is believed that a similar system based upon the absence concept would work for other small libraries up to the point that a large volume of circulation transactions causes preparation of the input data to become burdensome.

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SANTA BARBARA PLANT
LIBRARY CIRCULATION REPORT

AS OF: 11/12/74

CALL NUMBER	TITLE	NAME	C.C.	SINCE	REMARK
HF 5500 F64	PROMOTABLE NOW	BAUERLE R	6200	9/09/74	CATALOGING
QA 76.52 A63	ANNL REV AUTO PROG V7 PT 3	LOST	6342	10/15/74	
QA 76.52 A75	SIGFIDET PROC 1971	HENIGE J	6200	9/06/74	
QA 76.52 A75	SIGFIDET PROC 1972	HENIGE J	6200	9/06/74	
QA 76.54 C6A75	MODULAR PROGRAMMING IN COBOL	LANE J	7616	9/12/74	
REF HF 5547 L20	DP SECRETARYS HANDBOOK	MURRAY A	8100	9/16/74	
STAN SEL-73-029	DECOMPILATION OF OBJECT PROGS	LANGLET T	6210	11/29/72	
TK 7885 J74	AFIPS FJCC 1972, VOL 2	RIOS G	6313	11/11/74	RESERVED
WIRTH	SYSTEMATIC PROGRAMMING	PHILLIPS R	6300	9/06/74	
168	PRINC OPER VENUS MICROPROGRAM	AHLSTROM J	6211	9/05/74	

SANTA BARBARA PLANT
LIBRARY CIRCULATION REPORT

AS OF: 11/12/74

LIBRARY RECORDS SHOW THE FOLLOWING ITEMS ARE CHECKED OUT TO YOU. PLEASE RETURN ANY YOU ARE NO LONGER USING. REPORT ANY DISCREPANCIES TO THE LIBRARIAN.

CALL NUMBER	TITLE			SINCE
168	PRINC OPER VENUS MICROPROGRAM	AHLSTROM J	6211	9/05/74
HF 5500 F64	PROMOTABLE NOW	BAUERLE R	6200	9/09/74
QA 76.52 A75	SIGFIDET PROC 1971	HENIGE J	6200	9/06/74
QA 76.52 A75	SIGFIDET PROC 1972	HENIGE J	6200	9/06/74
QA 76.54 C6A75	MODULAR PROGRAMMING IN COBOL	LANE J	7616	9/12/74
STAN SEL-73-029	DECOMPILATION OF OBJECT PROGS	LANGLET T	6210	11/29/72
QA 76.52 A63	ANNL REV AUTO PROG V7 PT 3	LOST	6342	10/15/74
REF HF 5547 L20	DP SECRETARYS HANDBOOK	MURRAY A	8100	9/16/74
WIRTH	SYSTEMATIC PROGRAMMING	PHILLIPS R	6300	9/06/74
TK 7885 J74	AFIPS FJCC 1972, VOL 2	RIOS G	6313	11/11/74

HENIGE J 6200

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LIBRARY CIRCULATION REPORT

AS OF: 11/12/74

LIBRARY RECORDS SHOW THE FOLLOWING ITEMS ARE CHECKED OUT TO YOU. PLEASE RETURN ANY YOU ARE NO LONGER USING. REPORT ANY DISCREPANCIES TO THE LIBRARIAN.

CALL NUMBER	TITLE	SINCE
QA 76.52 A75	SIGFIDET PROC 1971	9/06/74
QA 76.52 A75	SIGFIDET PROC 1972	9/06/74

SANTA BARBARA PLANT
LIBRARY CIRCULATION REPORT

AS OF: 11/12/74

COLLECTION USAGE:	CALL NUMBER		COUNT	DATE
	HF 5500 F64		1	9/09/74
	QA 76.52 A63	08703	1	10/15/74
	QA 76.52 A75	71	1	9/06/74
	QA 76.52 A75	72	1	9/06/74
	QA 76.54 C6A75		1	9/12/74
	REF HF 5547 L20		1	9/16/74
	STAN SEL-73-029		1	11/29/72
	TK 7885 J74	04102	1	11/11/74
	WIRTH	091174	1	9/06/74
	168		1	9/05/74

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LIBRARY CIRCULATION REPORT

AS OF: 11/13/74

ACTIVITY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
GENL.MGR.	1			1		1	1		1				5
CONTROLLER			1	1		1	1	1					5
INDUS.REL.	5					1							6
PURCHASING				3				2					5
MGT. SYS.	6	3	3	1		2	3	2	2				22
MANUFACT.				5	4		3	9	3				24
Q.A.			3	2	5	2	3	5	2				22
SOFTWARE	30	29	43	36	26	41	51	68	61				386
HARDWARE	24	13	20	10	16	17	21	26	29				177
INTL TIO							1						1
BHG TIO	2	9	5	2		1	3	4	2				28
OTHER				6		2		2					10
TOTALS	68	54	75	67	51	68	87	119	100				691